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RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/786,480B

DATE: 09/10/2002 P.6
TIME: 12:48:56

Input Set : A:\MSIB005.ST25.txt

Output Set: N:\CRF4\09102002\I786480B.raw

3 <110> APPLICANT: Goldsbrough, Andrew
 4 Colliver, Steve
 6 <120> TITLE OF INVENTION: Isoforms of Starch Branching Enzyme II (SBE-IIA and SBE-IIB)
 From Wheat
 8 <130> FILE REFERENCE: 11951.0005.PCUS00 MSIB:005
 10 <140> CURRENT APPLICATION NUMBER: 09/786,480B
 C--> 11 <141> CURRENT FILING DATE: 2002-06-25
 13 <150> PRIOR APPLICATION NUMBER: PCT/GB99/03011
 14 <151> PRIOR FILING DATE: 1999-09-09
 16 <150> PRIOR APPLICATION NUMBER: EP 98307337.0
 17 <151> PRIOR FILING DATE: 1998-09-10
 19 <160> NUMBER OF SEQ ID NOS: 55
 21 <170> SOFTWARE: PatentIn version 3.1
 23 <210> SEQ ID NO: 1
 24 <211> LENGTH: 2307
 25 <212> TYPE: DNA
 26 <213> ORGANISM: Triticum aestivum
 28 <220> FEATURE:
 29 <221> NAME/KEY: misc_feature
 30 <222> LOCATION: (2036)..(2270)
 31 <223> OTHER INFORMATION: N = any nucleotide
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 39 gagaatgat actccatctg ggataaagga ttcaattcct gcttggatca agtactccgt 180
 41 gcagactcca ggagatatac catacaatgg aatatattat gatcctcccg aagaggagaa 240
 43 gtatgtattc aagcatcctc aacctaaacg accaaaatca ttgcggatat atgaaacaca 300
 45 tgttggcatg agtagcccg aaccaaagat caacacatat gcaaaactca gggatgaggt 360
 47 gcttccaaga attaaaagac ttggatacaa tgcagtgcaa ataatggcaa tccaggagca 420
 49 ctcatactat ggaagctttg ggtaccatgt taccaatttc tttgcaccaa gtagccgttt 480
 51 tgggtcccca gaagatttaa aatctttgat tgatagagct caccagcttg gcttggttgt 540
 53 cctcatggat gttgttcaca gtcacgcgtc aaataatacc ttggacgggt tgaatggttt 600
 55 tgatggcacg gatacacatt acttccatgg cggttcacgg ggccatcact ggatgtggga 660
 57 ttcccgtgtg ttttaactatg ggaataagga agttataagg tttctacttt ccaatgcaag 720
 59 atgggtggcta gaggagtata agtttgatgg tttccgattc gatggcgcga cctccatgat 780
 61 gtatacccat catggattac aagtaacctt tacaggaagc taccatgaat attttggctt 840
 63 tgccactgat gtagatgcgg tcgtttactt gatgctgatg aatgatctaa ttcattgggtt 900
 65 ttatcctgaa gccgtaacta tcggtgaaga tgttagtga atgcctacat ttgcccttcc 960
 67 tgttcaagtt ggtggggttg gttttgacta tcgcttacat atggctgttg ccgacaaatg 1020
 69 gattgaactt ctcaaaggaa acgatgaagc ttgggagatg ggtaatatg tgcacacact 1080
 71 aacaaacaga aggtggccgg aaaagtgtgt tacttatgct gaaagtcacg atcaagcact 1140
 73 ggttggagac aagactattg cattctggtt gatggacaag gatatgtatg atttcatggc 1200
 75 tctgaacgga ccttcgacac ctagtattga tcgtggaata gcactgcata aaatgattag 1260
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81 cccaggaaac aacaacagtt acgacaaatg cgcgcgaaga tttgaccagg gtgatgcaga 1440
83 atttccttagg tatcatggta tgcagcagtt tgatcaggcg atgcagcatc ttgaggaaaa 1500
85 atatggcttt atgacatcag accaccagta cgtatctcgg aaacatgagg aagataaggt 1560
87 gatcgtgttt gaaaaagggg acttggtatt tgtgttcaac ttccactgga gtaatagcta 1620
89 tttcgactac cgggttggct gtttaaagcc tgggaagtac aagggtgtct tagactcaga 1680
91 cgccggactc tttggtggat ttggtaggat ccatcacact gcagagcact tcacttctga 1740
93 ctgccaacat gacaacaggc cccattcggt ctcagtgtac actcctagca gaacctgtgt 1800
95 tgtctatgct ccaatgaact aaacagcaaa gtgcagcata cgcagtcacg ctggtgttgc 1860
97 tagcactagc aagaaaaaat cgtatgggtca atacaaccag gtgcaagggt taataagggt 1920
99 ttgcttcaac gagtcctgga tagacaagac aacatgatga tgtgctctgt gctcccaaat 1980
W--> 101 tcccagggcg ttgtggagaa aaaatgctca tctgtgttat tttatggatc agggangaaa 2040
W--> 103 cctcccccaa anaccctttt tttttttgaa agngggatag gcccccggtt tctgcatntg 2100
W--> 105 gatgcctcct taaatntttg tagccataaa ccattgctag tgtcctntaa attgacagtt 2160
W--> 107 tagaatagng gttntacttt tgtattttnt ttttgacagt tagactgtat tcttcaaata 2220
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127 <222> LOCATION: (675)..(746)
128 <223> OTHER INFORMATION: Xaa = any amino acid
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137 Trp Glu Met Phe Leu Pro Asn Asn Ala Asp Gly Ser Pro Pro Ile Pro
138 20 25 30
141 His Gly Ser Arg Val Lys Val Arg Met Asp Thr Pro Ser Gly Ile Lys
142 35 40 45
145 Asp Ser Ile Pro Ala Trp Ile Lys Tyr Ser Val Gln Thr Pro Gly Asp
146 50 55 60
149 Ile Pro Tyr Asn Gly Ile Tyr Tyr Asp Pro Pro Glu Glu Lys Tyr
150 65 70 75 80
153 Val Phe Lys His Pro Gln Pro Lys Arg Pro Lys Ser Leu Arg Ile Tyr
154 85 90 95
157 Glu Thr His Val Gly Met Ser Ser Pro Glu Pro Lys Ile Asn Thr Tyr
158 100 105 110
161 Ala Asn Phe Arg Asp Glu Val Leu Pro Arg Ile Lys Arg Leu Gly Tyr
162 115 120 125
165 Asn Ala Val Gln Ile Met Ala Ile Gln Glu His Ser Tyr Tyr Gly Ser
166 130 135 140
169 Phe Gly Tyr His Val Thr Asn Phe Phe Ala Pro Ser Ser Arg Phe Gly

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173 Ser Pro Glu Asp Leu Lys Ser Leu Ile Asp Arg Ala His Glu Leu Gly
174          165          170          175
177 Leu Val Val Leu Met Asp Val Val His Ser His Ala Ser Asn Asn Thr
178          180          185          190
181 Leu Asp Gly Leu Asn Gly Phe Asp Gly Thr Asp Thr His Tyr Phe His
182          195          200          205
185 Gly Gly Ser Arg Gly His His Trp Met Trp Asp Ser Arg Val Phe Asn
186          210          215          220
189 Tyr Gly Asn Lys Glu Val Ile Arg Phe Leu Leu Ser Asn Ala Arg Trp
190 225          230          235          240
193 Trp Leu Glu Glu Tyr Lys Phe Asp Gly Phe Arg Phe Asp Gly Ala Thr
194          245          250          255
197 Ser Met Met Tyr Thr His His Gly Leu Gln Val Thr Phe Thr Gly Ser
198          260          265          270
201 Tyr His Glu Tyr Phe Gly Phe Ala Thr Asp Val Asp Ala Val Val Tyr
202          275          280          285
205 Leu Met Leu Met Asn Asp Leu Ile His Gly Phe Tyr Pro Glu Ala Val
206          290          295          300
209 Thr Ile Gly Glu Asp Val Ser Gly Met Pro Thr Phe Ala Leu Pro Val
210 305          310          315          320
213 Gln Val Gly Gly Val Gly Phe Asp Tyr Arg Leu His Met Ala Val Ala
214          325          330          335
217 Asp Lys Trp Ile Glu Leu Leu Lys Gly Asn Asp Glu Ala Trp Glu Met
218          340          345          350
221 Gly Asn Ile Val His Thr Leu Thr Asn Arg Arg Trp Pro Glu Lys Cys
222          355          360          365
225 Val Thr Tyr Ala Glu Ser His Asp Gln Ala Leu Val Gly Asp Lys Thr
226          370          375          380
229 Ile Ala Phe Trp Leu Met Asp Lys Asp Met Tyr Asp Phe Met Ala Leu
230 385          390          395          400
233 Asn Gly Pro Ser Thr Pro Ser Ile Asp Arg Gly Ile Ala Leu His Lys
234          405          410          415
237 Met Ile Arg Leu Ile Thr Met Gly Leu Gly Gly Glu Gly Tyr Leu Asn
238          420          425          430
241 Phe Met Gly Asn Glu Phe Gly His Pro Glu Trp Ile Asp Phe Pro Arg
242          435          440          445
245 Gly Pro Gln Val Leu Pro Thr Gly Lys Phe Ile Pro Gly Asn Asn Asn
246          450          455          460
249 Ser Tyr Asp Lys Cys Arg Arg Arg Phe Asp Gln Gly Asp Ala Glu Phe
250 465          470          475          480
253 Leu Arg Tyr His Gly Met Gln Gln Phe Asp Gln Ala Met Gln His Leu
254          485          490          495
257 Glu Glu Lys Tyr Gly Phe Met Thr Ser Asp His Gln Tyr Val Ser Arg
258          500          505          510
261 Lys His Glu Glu Asp Lys Val Ile Val Phe Glu Lys Gly Asp Leu Val
262          515          520          525
265 Phe Val Phe Asn Phe His Trp Ser Asn Ser Tyr Phe Asp Tyr Arg Val
266          530          535          540

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269 Gly Cys Leu Lys Pro Gly Lys Tyr Lys Val Val Leu Asp Ser Asp Ala
270 545 550 555 560
273 Gly Leu Phe Gly Gly Phe Gly Arg Ile His His Thr Ala Glu His Phe
274 565 570 575
277 Thr Ser Asp Cys Gln His Asp Asn Arg Pro His Ser Phe Ser Val Tyr
278 580 585 590
281 Thr Pro Ser Arg Thr Cys Val Val Tyr Ala Pro Met Asn Thr Ala Lys
282 595 600 605
285 Cys Ser Ile Arg Met His Ala Val Val Ala Ser Thr Ser Lys Lys Lys
286 610 615 620
289 Ser Tyr Gly Gln Tyr Asn Gln Val Gln Gly Leu Ile Arg Val Cys Phe
290 625 630 635 640
293 Asn Glu Ser Trp Ile Asp Lys Thr Thr Cys Ala Leu Cys Ser Gln Ile
294 645 650 655
297 Pro Arg Ala Leu Trp Arg Lys Asn Ala His Leu Cys Tyr Phe Met Asp
298 660 665 670
W--> 301 Gln Gly Xaa Asn Leu Pro Gln Xaa Pro Leu Phe Phe Leu Lys Gly Gly
302 675 680 685
W--> 305 Ala Pro Gly Xaa Cys Xaa Trp Met Pro Pro Xaa Phe Val Ala Ile Asn
306 690 695 700
W--> 309 His Cys Cys Pro Xaa Asn Gln Phe Arg Ile Xaa Val Xaa Leu Leu Tyr
310 705 710 715 720
W--> 313 Phe Xaa Phe Asp Ser Thr Val Phe Leu Lys Ser Thr Cys Cys Leu Leu
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321 Lys Lys Lys Lys Lys Asn
322 755
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327 <212> TYPE: DNA
328 <213> ORGANISM: Triticum aestivum
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333 <223> OTHER INFORMATION: N = any nucleotide
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341 atgggaaatg agttcgggca tcctgaatgg atagactttc caagaggccc acaagtactt 180
343 ccaagtggta agttcatccc aggaaacagc aacagttacg acaaatgccg tcgaagattt 240
345 gacctgggtg atgcagaatt tcttaggtat catggtatgc agcagtttga tcaggcaatg 300
347 cagcatcttg agaaaaata tggttttatg acatcagacc accagtacgt atctcggaaa 360
349 cactggagta atagctatct cgactaccgg gtcggctgtt taaagcctgg gaagtacaag 480
351 gtaggtcttag actcagacgc tggactcttt ggtggatttg gtaggatcca tcacactgca 540
353 gagcaattca cttctgactg ccaacatgac aacaggcccc attcgttctc agtgtacact 600
355 cctagcagaa cctgtgttgt ctatgctcca atgaactaac agcaagggtg agcatacgcg 660
357 tgcgcgctgt tgttgctagt agcaagaaaa atcgtagcgt caatacagcc aggtgcaagg 720

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Input Set : A:\MSIB005.ST25.txt

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363 cgtgtgctcc caatccccag ggcgtttgtga agaaaacatg ctcatctgtg ttatgatttt 840
365 atggatcagc gacgaaactt cccccaaata cccatgcctc cttaaacttt tgtggccgta 900
367 aaccattgct agtgtcctct aaattgacag tttagcatag aggttttact tttgtatctt 960
369 ctttttgaca gtttagacttt attcctcaaa taatcgacca gtcgtttact cgaaaaaaaa 1020
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390 atgggaaatg agttcgggca tcctgaatgg atagactttc caagaggccc acaagtactt 180
W--> 392 ccaactggta agttcatccc nngaaacaac aacagttacg acaaatgccg tcgaaaattt 240
394 gacctgggtg atgcagaatt tcttaggtat catggtatgc agcagtttga tcaggcgatg 300
396 cagcatcttg aggaaaaata tggctttatg acatcagacc accagtacgt atctcggaaa 360
398 catgaggaaag ataaggtgat cgtgtttgaa aaaggggact tggattttgt gttcaacttc 420
400 cactggagta atagctatct cggctaccgg gttggctgtt taaagcctgg gaagtacaag 480
402 gttgtcttag actcagacgc cggactcttt ggtggatttg gtaggatcca tcacactgca 540
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406 cctagcagaa cctgtgttgt ctatgctcca atgaactaaa cagcaaagtg cagcatacgc 660
408 atgcacgctg ttgttgctag cactagcaag aaaaaatcgt atggtcaata caaccagggtg 720
410 caaggtttaa taagggtttt tgcttcaacg agtctctggat agacaagaca acatgatgat 780
W--> 412 gtgctctgtg ctcccaaat cccagggcgt tgnnggaaa acatgctcat ctgtgttatc 840
W--> 414 attttatgga tcagnngnga aacctcccc aaatacccat gcctccttaa acttttgtgg 900
416 tcctaaacca tggctactat cctctaaatt ggcagtttag catagagggt ttacttttgt 960
418 aaattttttt tgacagttaa tagactctat tcctcaataa attgacatgt cctttacaag 1020
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433 <223> OTHER INFORMATION: N = any nucleotide
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441 atgggaaatg agttcgggca tcctgaatgg atagactttc caagaggccc acaagtactt 180
443 ccaagtggta agttcatccc aggaacaac aacagttacg acaaatgccg tcgaagattt 240
445 gacctgggtg atgcagaatt tcttaggtat catggtatgc agcagtttga tcaggcaatg 300
447 cagcatcttg aggaaaaata tggttttatg acatcagacc accagtacgt ttctcggaaa 360

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Please Note:

Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

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Seq#:2; Xaa Pos. 675,680,692,694,699,709,715,717,722,738,745,746
Seq#:3; N Pos. 77,1036
Seq#:4; N Pos. 201,202,813,815,855,857
Seq#:5; N Pos. 802,849,865,887,903,911,929,960,982,987,1002,1057,1080,1083
Seq#:6; N Pos. 763
Seq#:9; N Pos. 169,216,232,254,270,278,296,327,349,354,369,424,447
Seq#:10; N Pos. 179,181,221,223
Seq#:54; Xaa Pos. 6,21,26,30,31,40,41,45,59,61,62,63,64,66,69,70,71,74,75
Seq#:54; Xaa Pos. 87,90,96,97,98,100,101,105,129,130,132,142,143,159,368
Seq#:54; Xaa Pos. 457,475,506,511,558,559,701,702,715,723,724,727,734,735
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Seq#:54; Xaa Pos. 781,782,783,784,785,788,790,792,793,794,795,796,797,798
Seq#:54; Xaa Pos. 799,801,802,803,804,805,806,808,809,810,812,814,816,817
Seq#:54; Xaa Pos. 818,821,822,823,824,825,826,827,828,829,830,832,833,834
Seq#:54; Xaa Pos. 835,838,839,840,841,842,844,845,846,847,848,849,852,854
Seq#:54; Xaa Pos. 855,856,857,860,861,862,863,864,865,866,868,869,870,871
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L:101 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:1 after pos.:1980

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L:305 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:2 after pos.:688

L:309 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:2 after pos.:704

L:313 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:2 after pos.:720

L:317 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:2 after pos.:736

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L:371 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:3 after pos.:1020

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L:412 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:4 after pos.:780

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L:512 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:6 after pos.:720

L:623 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:9 after pos.:120

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L:4561 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:54 after pos.:48

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L:4569 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:54 after pos.:80

L:4573 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:54 after pos.:96

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L:4585 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:54 after pos.:144

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L:4661 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:54 after pos.:448

L:4665 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:54 after pos.:464

L:4673 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:54 after pos.:496

L:4685 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:54 after pos.:544

L:4721 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:54 after pos.:688

L:4725 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:54 after pos.:704

L:4729 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:54 after pos.:720

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Input Set : A:\MSIB005.ST25.txt

Output Set: N:\CRF4\09102002\I786480B.raw

L:4733 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:54 after pos.:736
L:4737 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:54 after pos.:752
L:4741 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:54 after pos.:768